

DETAILED ACTION

Response to Amendment

This Office action is in response to Applicant's communication filed July 9, 2008 in response to the Office action dated June 29, 2007. Claims 33, 34, 36, 41, and 43 have been amended. Claims 35 and 37-40 have been canceled. New claim 44 has been added. Claims 33, 34, 36, 41, 43, and 44 are pending in this application.

ACKNOWLEDGMENT OF REFERENCES CITED BY APPLICANT

Information Disclosure Statement

1. As required by MPEP § 609(c), Applicant's submission of the Information Disclosure Statement dated July 16, 2008 is acknowledged by the Examiner and the cited references have been considered in the examination of the claims now pending. As required by MPEP § 609 c(2), a copy of the PTOL-1449 initialed and dated by the Examiner is attached to the instant Office action.

OBJECTIONS

Claims

1. **Claims 34, 36, 41, 43, and 44** are objected to because the phrase "**A** data storage apparatus according to claim..." on lines 1 respectively should instead read "**The** data storage apparatus according to claim..."

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2. **Claim 36** is also objected to because it depends on a canceled claim (claim 35).

For the purposes of examining the instant application, the Examiner will interpret the claim to be dependent on claim 34.

REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 33 and 34** are rejected under 35 U.S.C. 103(a) as being unpatentable over LeCrone et al. (U.S. Patent 6,070,224) (hereinafter “LeCrone”) in view of Blood et al. (U.S. Patent Application Publication 2003/0110351) (hereinafter “Blood”).

4. **As per claim 33**, LeCrone discloses a plurality of disk drives configured to a plurality of non-removable storage volumes (col. 4, lines 30-35; Fig. 1, elements 41 and 43);

a network interface to be coupled to a computer (col. 4, lines 1-4 and 11-13; Fig. 1, elements 25 and 21-n);

a control unit coupled to the disk devices and to the network interface (col. 4, lines 25-28; Fig. 1, element 34);

and a memory coupled to the control unit (col. 4, lines 29-30; Fig. 1, element 37),

wherein the control unit receives a verification command from the computer to identify whether a removable storage device is present (col. 6, lines 34-42; Fig. 4, elements 84 and 85),

wherein the control unit sends a reply to the computer indicating that a removable storage device is present, the removable storage device being virtualized, as a first virtualized removable storage device (col. 6, lines 56-65; Fig. 4, element 86). *It should be noted that a "virtual tape" is analogous to a "virtualized removable storage device."*

LeCrone does not disclose the removable storage device being related to a first storage volume of the plurality of non-removable storage volumes and not being related to a plurality of other storage volumes of the plurality of non-removable storage volumes such that the computer can access the first storage volume as a removable storage device.

Blood discloses the removable storage device being related to a first storage volume of the plurality of non-removable storage volumes and not being related to a plurality of other storage volumes of the plurality of non-removable storage volumes such that the computer can access the first storage volume as a removable storage device (paragraphs 0027-0028). *It should be noted that the "emulated floppy disk" is analogous to the "first storage volume" and the "emulated disk drive" is analogous to the "other storage volumes." It should also be noted that the "ATA controller" is analogous to the "computer."*

LeCrone and Blood are analogous art because they are from the same field of endeavor, that being storage systems.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to implement Blood's virtual disk subsystem within LeCrone's storage system because all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded the predictable results of enabling a data processing system to execute software that normally would require a local disk drive thereby eliminating the need for local disk drives.

5. **As per claim 34**, the combination of LeCrone/Blood discloses wherein in order for the computer to be booted, the first storage volume that is indicated as being a non-removable storage device is recognized by the computer while the plurality of other non-removable volumes are not recognized by the computer (Blood, paragraph 0029; paragraph 0031).

6. **Claim 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over LeCrone in view of Blood as applied to claim 34 above, and further in view of Allen et al. (U.S. Patent 5,546,557) (hereinafter "Allen").**

7. **As per claim 36**, the combination of LeCrone/Blood discloses all the limitations of claim 36 except based on receiving a second instruction from the computer for ejecting the first virtualized removable storage device, the control unit modifies a volume

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management table so that the computer recognizes that the first virtualization removable storage device is ejected,

and wherein the control unit notifies the computer of completion of ejecting the first virtualized removable storage device.

Allen discloses based on receiving a second instruction from the computer for ejecting the first virtualized removable storage device, the control unit modifies a volume management table so that the computer recognizes that the first virtualization removable storage device is ejected (, col. 23, lines 26-47; col. 24, lines 13-14);

and wherein the control unit notifies the computer of completion of ejecting the first virtualized removable storage device (col. 24, lines 13-14).

The combination of LeCrone/Blood and Allen are analogous art because they are from the same field of endeavor, that being storage systems.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to implement Allen's volume management technique within LeCrone/Blood's storage system because all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded the predictable results of storing a plurality of logical data storage volumes in one physical data storage volume wherein the data management activates in a host processor and of the attending personnel do not change for defining volumes.

8. **Claims 41 and 42 are rejected under 35 U.S.C. 103(a) as being obvious over LeCrone in view of Blood as applied to claim 33 above, and further in view of Ofek (U.S. Patent 6,101,497).**

9. **As per claim 41**, the combination of LeCrone/Blood discloses all the limitations of claim 20 except the second the second storage volume is set as a replica volume of the first storage volume,

and wherein the control unit stores data into the first storage volume and the second storage volume if the control unit receives a write command for writing data to the first removable storage device from the computer.

Ofek discloses the second the second storage volume is set as a replica volume of the first storage volume (col. 8, lines 32-34 and 52-56; Fig. 1, elements 15, 196, 42, and 43);

and wherein the control unit stores data into the first storage volume and the second storage volume if the control unit receives a write command for writing data to the first removable storage device from the computer (col. 11, lines 5-13).

The combination of LeCrone/Blood and Ofek are analogous art because they are from the same field of endeavor, that being storage systems.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to implement Ofek's mirror system within LeCrone/Blood's storage system because all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded the predictable

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results of increasing system reliability by providing a data processing system that includes redundant storage of data and that enables access to the data by multiple processes.

10. **As per claim 42**, the combination of LeCrone/Blood/Ofek discloses in response to receiving an instruction for stopping a replication from the computer, the control unit stops storing the data into the second storage volume (Ofek, col. 11, lines 24-30; col. 30, lines 35-37).

11. **Claims 43 and 44 are rejected under 35 U.S.C. 103(a) as being obvious over LeCrone in view of Blood as applied to claim 34 above, further in view of Allen as applied to claim 36 above, and even further in view of Ofek.**

12. **As per claim 43**, the combination of LeCrone/Blood/Allen discloses all the limitations of claim 20 except the second the second storage volume is set as a replica volume of the first storage volume,

and wherein the control unit stores data into the first storage volume and stores data to be stored in the first storage volume to the second storage volume if the control unit receives a write command for writing data to the first virtual storage device from the computer.

and wherein, based on receiving another instruction from the computer, the control unit stops storing the data into the second storage volume.

Ofek discloses the second the second storage volume is set as a replica volume of the first storage volume (col. 8, lines 32-34 and 52-56; Fig. 1, elements 15, 196, 42, and 43),

and wherein the control unit stores data into the first storage volume and stores data to be stored in the first storage volume to the second storage volume if the control unit receives a write command for writing data to the first virtual storage device from the computer (col. 11, lines 5-13),

and wherein, based on receiving another instruction from the computer, the control unit stops storing the data into the second storage volume (col. 11, lines 24-30; col. 30, lines 35-37).

The combination of LeCrone/Blood/Allen and Ofek are analogous art because they are from the same field of endeavor, that being storage systems.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to implement Ofek's mirror system within LeCrone/Blood/Allen's storage system because all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded the predictable results of increasing system reliability by providing a data processing system that includes redundant storage of data and that enables access to the data by multiple processes.

13. **As per claim 44**, the combination of LeCrone/Blood/Allen/Ofek discloses the data in the second storage volume is a copy of data in the first storage volume, and wherein said another instruction instructs to stop copying (Ofek, col. 8, lines 32-34 and 52-56; Fig. 1, elements 15, 196, 42, and 43; col. 11, lines 24-30; col. 30, lines 35-37).

Response to Arguments

14. Applicant's arguments filed July 9, 2008 with respect to **claims 33, 34, 36, 41, 43, and 44** have been considered but are moot in view of the new grounds of rejection above.

Conclusion

STATUS OF CLAIMS IN THE APPLICATION

The following is a summary of the treatment and status of all claims in the application as recommended by MPEP 707.70(i):

CLAIMS REJECTED IN THE APPLICATION

Per the instant office action, **claims 33, 34, 36, 41, 43, and 44** have received a second action on the merits and are subject of a second action final.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arpan P. Savla whose telephone number is (571) 272-1077. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on (571) 272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Arpan Savla/
Examiner, Art Unit 2185
October 14, 2008

Application/Control Number: 10/720,308

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